

Subject card

Subject name and code	Probability Theory, PG_00155422						
Field of study	Mathematics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2027/2028		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		7.0		
Learning profile	academic		Assessment form		exam		
Conducting unit	Institute of Mathematics -> Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Piotr Szuca				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	45.0	0.0	0.0	0.0	90
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	90		10.0		75.0	175
Subject objectives	The aim of the course is to familiarize the student with the basic concepts of probability theory.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[MATL3_U08] is able to formulate definitions and theorems in an understandable way, both orally and in writing, and present correct mathematical reasoning regarding the acquired issues	The student verifies the basic properties of probability spaces and random variables and proves simple facts about probability spaces and random variables.	[SU4] test/exam - oral or written
	[MATL3_W02] knows and understands the basic concepts, methods and theorems of mathematical analysis as well as basic examples illustrating specific concepts in this field and enabling the refutation erroneous hypotheses or unauthorized reasoning	The student knows and understands the basic concepts, theorems and methods of probability calculus.	[SW4] test/exam - oral or written
	[MATL3_U09] is able to plan how to solve a specific problem and prepare a correct record of this solution, providing strict and precise justification for the correctness of his reasoning	The student verifies the basic properties of probability spaces and random variables and proves simple facts about probability spaces and random variables.	[SU4] test/exam - oral or written
	[MATL3_K04] is ready to understand and appreciate the importance of intellectual honesty in one's own and other people's actions; is willing to act ethically	The student understands and appreciates the importance of intellectual honesty in his/her own and other people's actions; acts ethically.	[SK8] observation of student's independent or team work
	[MATL3_U05] is able to correctly use the known concepts of probability and statistics, is able - at a simple and medium level of difficulty - to apply the known theorems and methods in these fields and is able to interpret the obtained results	The student verifies the basic properties of probability spaces and random variables and proves simple facts about probability spaces and random variables.	[SU4] test/exam - oral or written
	[MATL3_U04] is able to correctly use the acquired concepts of general algebra, is able - at a simple and medium level of difficulty - to apply the known theorems and methods of these fields and is able to interpret the obtained results	The student verifies the basic properties of probability spaces and random variables and proves simple facts about probability spaces and random variables.	[SU4] test/exam - oral or written
	[MATL3_W08] knows and understands the structure of mathematical theories, is able to use mathematical formalism to build and analyze simple mathematical models in other fields of science	The student knows and understands the basic concepts, theorems and methods of probability calculus.	[SW4] test/exam - oral or written
	[MATL3_W09] knows and understands the role and importance of proof in mathematics, as well as the concept of the importance of assumptions	The student knows and understands the basic concepts, theorems and methods of probability calculus.	[SW4] test/exam - oral or written
	[MATL3_K06] is ready to formulate opinions on basic mathematical issues	The student is able to formulate opinions on basic mathematical issues.	[SK8] observation of student's independent or team work
	[MATL3_W05] knows and understands the basic concepts, methods and theorems of probability and statistics, as well as basic examples illustrating specific concepts in these fields and enabling the refutation erroneous hypotheses or unauthorized reasoning	The student knows and understands the basic concepts, theorems and methods of probability calculus.	[SW4] test/exam - oral or written
	[MATL3_K01] is ready to accept the limitations of his/her own knowledge and understands the need for further education	The student knows the limitations of his/her own knowledge and understands the need for further or team work of the student in education.	[SK8] observation of student's independent or team work
	[MATL3_K10] is ready to analyze data and communicate the conclusions of such analysis in an accessible form	The student is ready to analyze data and communicate the conclusions from such analysis in an accessible form.	[SK8] observation of student's independent or team work

	Course outcome	Subject outcome	Method of verification
	[MATL3_K09] is ready to critically evaluate arguments, find gaps in reasoning and constructively criticize other people's reasoning	The student is ready to critically evaluate arguments, find gaps in reasoning and constructively criticize the reasoning of others.	[SK8] observation of student's independent or team work
	[MATL3_K02] is ready to precisely formulate questions to deepen his/her own understanding of a given topic or to find missing elements of reasoning	The student is able to formulate precisely questions that serve to deepen one's own understanding of a given topic or to find missing elements of reasoning.	[SK8] observation of student's independent or team work
	[MATL3_U02] is able to correctly use the known concepts of mathematical analysis, is able - at a simple and medium level of difficulty - to apply the known theorems and methods of this field and is able to interpret the obtained results	The student verifies the basic properties of probability spaces and random variables and proves simple facts about probability spaces and random variables.	[SU4] test/exam - oral or written
Subject contents	1. Probability space.2. Conditional probability and independence of events.3. Random variable and its probability distribution and cumulative distribution function.4. Independence of random variables.5. Expected value and variance of a random variable.6. Limit theorems.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	tests	51.0%	50.0%
	exam	51.0%	50.0%
	observation of the student's attitude	51.0%	0.0%
Recommended reading	Basic literature	1. J. Jakubowski, R. Sztencel Wstęp do teorii prawdopodobieństwa, SCRIPT Warszawa 2001;2. Plucińska, E. Pluciński, Probabilistyka: Rachunek prawdopodobieństwa. Statystyka matematyczna. Procesy stochastyczne, Wydawnictwa Naukowo - Techniczne Warszawa 2000.3. W.. Kryszicki i in. Rachunek prawdopodobieństwa i statystyka matematyczna w zadaniach4. J. Jakubowski, R. Sztencel, Rachunek prawdopodobieństwa dla (prawie) każdego, SCRIPT Warszawa 2006;	
	Supplementary literature	1. G. Krzykowski, M. Szreder Rachunek prawdopodobieństwa i statystyka matematyczna2. M. Krzyśko, Wykłady z teorii prawdopodobieństwa, WNT Warszawa 2000;3. R. Bartoszyński, D. Niewiadomska-Bugaj Probability and Statistical Inference4. Freund, Miller, Miller John E. Friends Mathematical Statistics with Applications	
	eResources addresses		
	Example issues/ example questions/ tasks being completed	not included	
Work placement	Not applicable		

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